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ELECTRONIC DEVICE INSPECTS BALL BEARINGS;
STUDY AIRCRAFT DESIGN WITH SHADOW PHOTOS

ELECTRIC EYE DETECTS INVISIBLE FLAWS -- Vechernyaya Moskva, No 84, 8 Apr 50

The testing of precision items in mass production has presented great difficulties. In the large machine-building plants the number of inspectors is as high as 20-30 percent of the total number of workers. Often testing the parts requires more time than their production.

This is true of testing the surface of balls for bearings. Occasionally the balls have slight cracks or scratches which are invisible to the naked eye; they may have specks of rust or larger cavities which the inspector has overlooked. These defects, if undiscovered, cause abrasion of the bearing or even serious breakdown of the machine.

These problems have raised the question of special apparatus for automatic testing. Designers have met with success in this direction. They have developed a small instrument with two boxes of electrical equipment. The balls are loaded into the magazine of this automatic machine, which passes them to a scanning device. The purpose of this device is to examine the entire surface of the balls, one after the other, with lightning-like speed under a microscopic eye which is much keener than the human eye.

The device, spinning at 4,000 revolutions per minute, whirls the balls in a rotary motion. A thin beam of light from a small electric bulb passes over the entire surface of the balls. Whenever this beam touches anything in its path, it immediately "reports" the light image reflected from the surface of the ball to a highly sensitive photoelectric cell. If the surface of the ball is clean and smooth, the image does not produce any change in operation of the photoelectric cell. The sorting device attached to the photoelectric cell remains in normal position, and deposits the balls, one after the other, in a box labeled "suitable."

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However, if the light beam comes in contact with the slightest crack or spot on the surface of the ball, the image registered loses its intensity, and transmits an alarm. The alarm is relayed in 1/100,000 of a second; the electronic instruments immediately withdraw the defective ball and direct it into the box labeled "defective."

In testing this automatic machine, 100 balls which had been carefully inspected by the naked eye were put into the magazine. Three of these, which were found defective, were examined again, but no flaws were perceptible to the eye. With the aid of a microscope one was found to have a speck of rust, and the other two, barely perceptible scratches. Someone present at the test removed a ball from the "suitable" box and marked it with a pencil. As many times as it was put through the machine after this, it was directed into the "defective" box.

This automatic inspection machine was developed by close collaboration of the Chairs of Instrument Building and Electrical Engineering of the Moscow Machine Tool and Tool Institute imeni I. V. Stalin. It was designed by P. M. Polyanskiy, fellow of the institute, and S. F. Korndorf, engineer.

The Ministry of the Automobile and Tractor Industry USSR should see to it that these automatic machines are quickly installed in its bearing plants. -- M. Klimov

SHADOW PHOTOGRAPHY AIDS AIRCRAFT DESIGNERS -- Znaniye-Sila, No 2, Feb 50

Shadow photography has proved to be of inestimable value to technicians studying the problems of supersonic flight. A model of the supersonic aircraft under study is placed in a special wind tunnel. Air is released in the tunnel from steel cylinders which are filled at a pressure of 100-150 atmospheres.

On one side of the model is a photographic plate and on the other a bright light. The varying pressures which build up in front of the model cause the airstream to be compressed in degrees corresponding to the resistance offered by the model. Since light is refracted in air proportionately to the degree of compression of the air, the photographic plate records the pattern of resistance offered by the model. By studying the photograph the designer can determine the causes of resistance and take steps to reduce it in future aircraft.

CLAIM NEW DEVICE CURES STAMMERING -- Zarya Vostoka, No 65, 26 Mar 50

The Ministry of Health Ukrainian SSR recently set up a test group to study correction of stammering by means of the correctophone, a new device designed by I. Ya. Derazhne. The experiment showed that children aged 3-4 could be cured of stammering in 3-8 sessions, children aged 7-10 in 3-4 weeks. Treatment of adults required 1½ months or more.

A special laboratory under Derazhne has been set up at the Kiev Institute of Labor Hygiene and Industrial Diseases for further development of the new treatment.

Series production of correctophones has already begun in Kiev.

PLANT UPS OUTPUT OF NEEDLES -- Moskovskiy Komsomolets, No 42, 6 Apr 50

The Kolyubakinskiy Plant in Ruzskiy Rayon is increasing its output of medical, phonograph, and sewing needles every month. Automatic equipment is widely used. Automatic machine tools are completing five or six complicated operations at one stroke.

Eighteen automatic machine tools were produced at the plant. -- S. Osipov

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